USER MANUAL

Model No. **10-780**

Microwave Switching Modules

Designed & Manufactured by:-

Pickering Interfaces Limited.
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HELP!!!

If you need assistance with your Pickering Interfaces Switching System: *Switching problems, Programming or Integration within your Test System. – Please ring Pickering Interfaces and ask for "Technical Support".*

Alternatively you may fax, email or connect to our Internet Web Site.

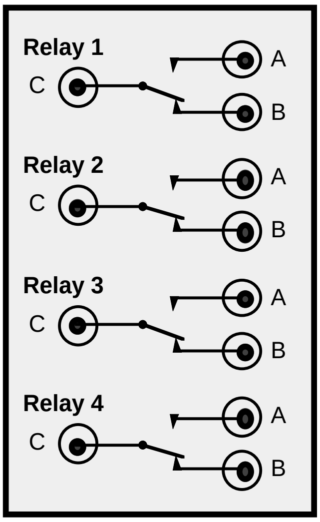
A full set of operating manuals, application notes and software drivers is available on CD ROM.

Contents

Section 1
Microwave Relay Module

1.1 Features

- 2 or 4 Changeover Switches per Module
- Switch up to 20W Power at 20GHz
- Direct 50Ω SMA Connection to Switch
- Tree Networks May Be Constructed by Inter-Linking Individual Modules



Pickering Interfaces microwave switching modules offer either 2 or 4 changeover switches per module. Connection is made direct to the switch using standard SMA female sockets.

Larger networks may easily be constructed by interconnecting individual switches.

1.2 SPDT Microwave Switch

Model **10-780** Changeover Switch General Information

Relay Type	Tesoel
Impedance	50Ω
Connector Type	SMA Jack
Nominal Frequency	20GHz
Operate Release Time	20mS max.
Life	10^6 operations

10-780-522	2 x SPDT 20GHz Switch
10-780-524	4 x SPDT 20GHz Switch

Table 1.1 10-780 Model Numbers

Impedance	50Ω
Maximum Voltage	100V d.c.
Maximum Current	1A
On Path Resistance	< 200 mW
Off Path Resistance	> 10^{10} Ω
Differential Thermal Offset	< 20µV
Expected Life	> 10^{6} Operations
Switching Time	< 20mS

Frequency/GHz	< 3	< 8	< 12	< 20
Loss/dB	< 0.2	< 0.3	< 0.4	< 0.5
VSWR	< 1.2	1.3	1.4	1.5
Isolation/dB	> 90	> 80	> 70	> 60
RF Switch Power/W	70	38	30	24

NB. Peak power switching can be well in excess of the above values but this will affect the switch life. Lower frequency power is also much higher, e.g. 400W at 0.1GHz, 200W at 0.4GHz.

Table 1.2 10-780 RF and General Specification

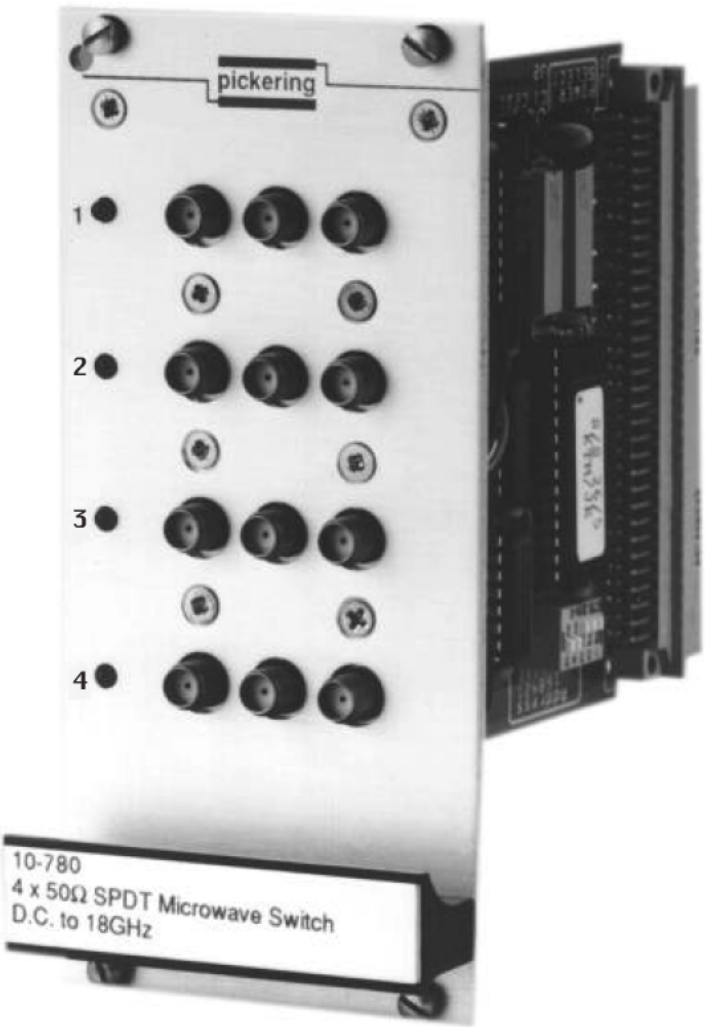


Fig 1.1 10-780-524 (4 x SPDT Microwave Relays)

1.3 Typical RF/Microwave Performance Plots



Fig 1.2 10-780 Insertion Loss To 20GHz

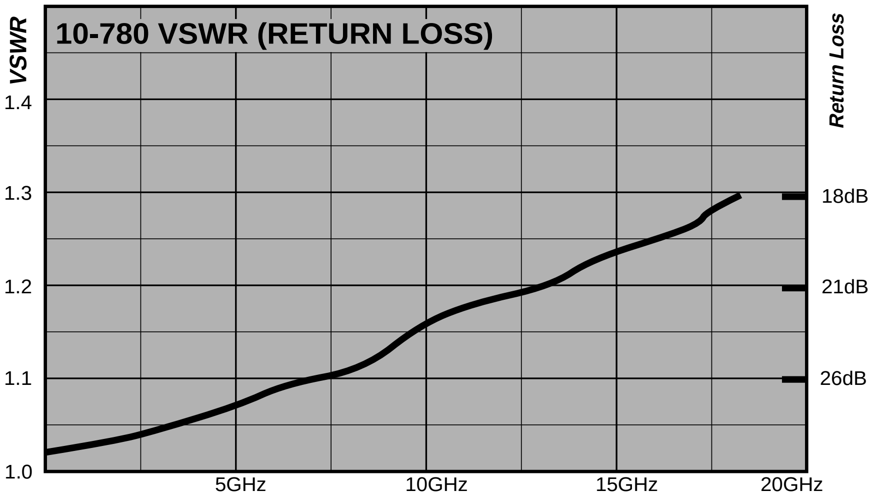


Fig 1.3 10-780 VSWR To 20GHz

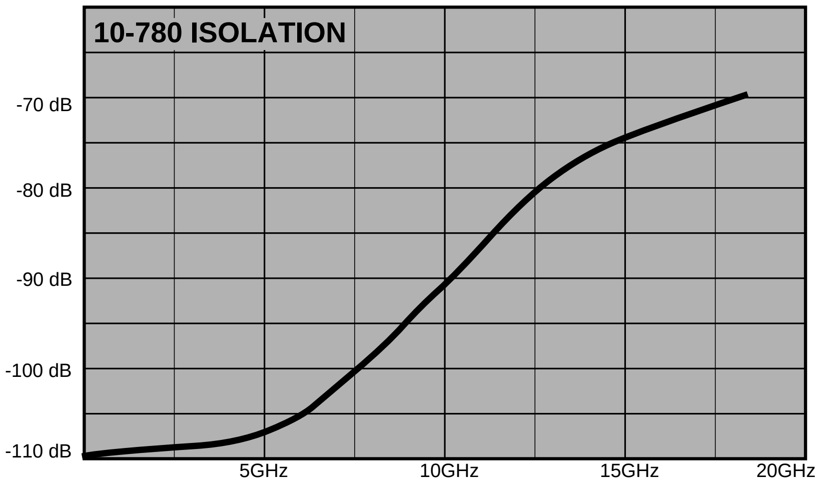
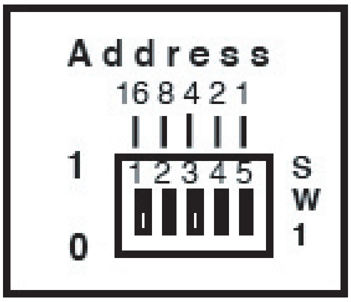


Fig 1.4 10-780 Isolation To 20GHz

2.1 Select Module Address

Choose device address (from 0 - 30) using the address select switch on the driver card.The address selected in the illustration is 22 (16 + 4 + 2 = 22).



2.2 10-780 Programming Using the Intelligent GPIB/RS-232 Interface

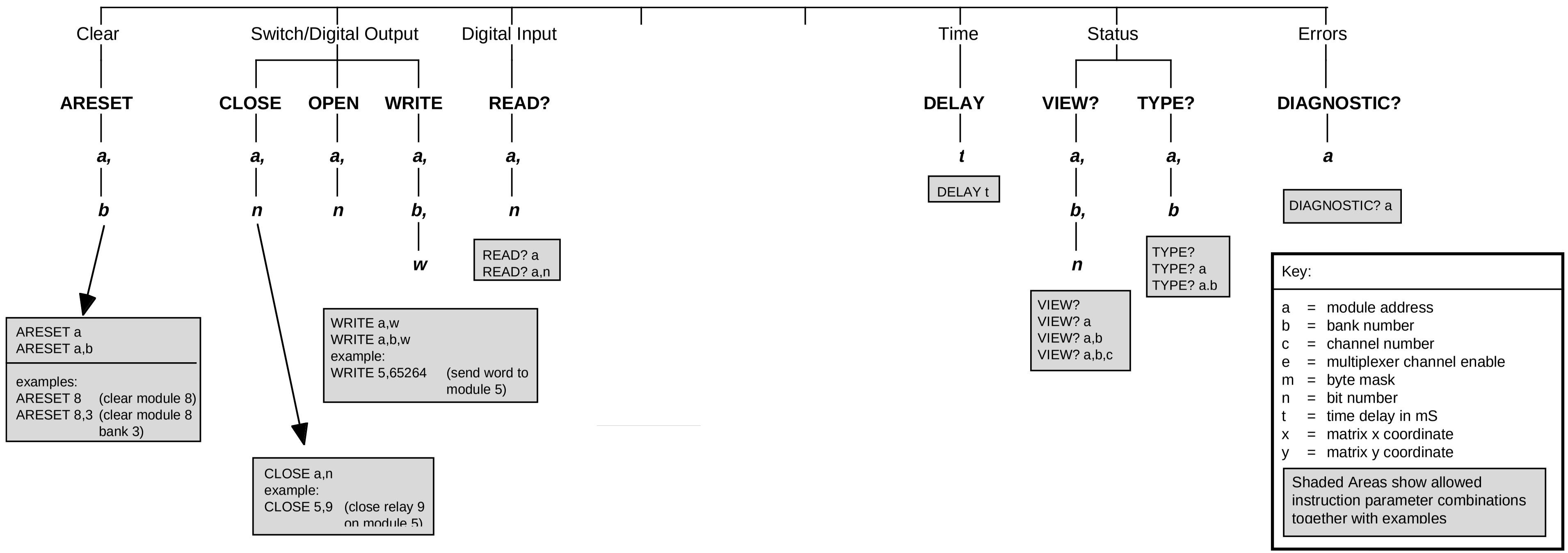
The 10-780 module is simple to program either by single bit or by word (8 bits).

ARESET a	Clear all outputs on module a
CLOSE a,b	Set bit number b on module a
DELAY t	Force a minimum delay of t milliseconds between two instructions
OPEN a,b	Clear bit number b on module a
RESET	Clear all bits/switches on all modules
SIZE s	This is used to specify the word size: s = 1 for byte, s = 2 for 16 bit word and s = 3 for 32 bit word (16bit is usually the factory default).
VIEW? a[,b]	View status of module a, can be viewed at any time either as a word or by bit b as a logical value (1 or0)
WRITE a,c,w	Send word w to module a block position cThe module is programmed as an 8 bit output port using either single bit, byte (8 bits), 16 bit word or 32 bit word:

The module is programmed as an 8 bit output port using either single bit, byte (8 bits), 16 bit word or 32 bit word:

to turn on relay 1 software command close,X,1 is required.
to turn on relay 2 software command close,X,3 is required.
to turn on relay 3 software command close,X,5 is required.
to turn on relay 4 software command close,X,7 is required.

Where X is the module address.



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Fig 2.1 10-780 Module Instruction Set

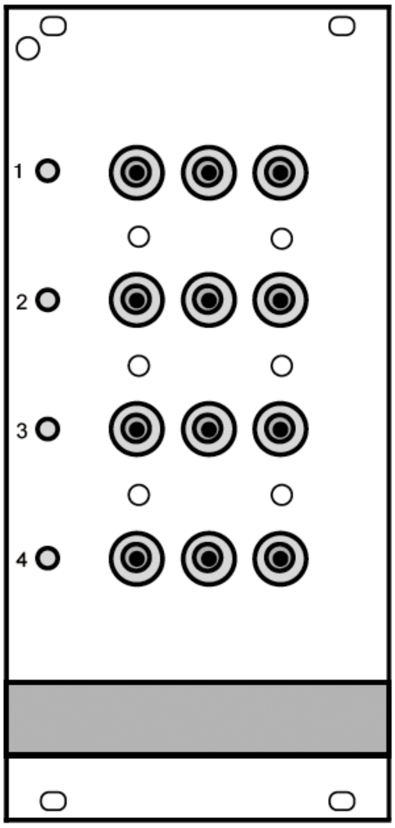


Fig 3.1 Microwave Module Front Panel with 4 Microwave Relays

(SMA 50Ω Co-Axial Plugs, Connection shown below)

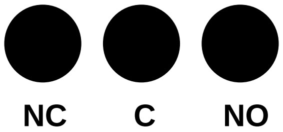


Fig 3.2 Microwave Relay Connections

(NC = Normally Closed, NO = Normally Open, C = Common)

Section 4
Electrical, Environmental & Mechanical Specifications

Environmental

Operating Temperature 0°C to 50°C.

Storage Temperature -20°C to 75°C.

Humidity 95% non condensing.

Weight Dimensions and Power Requirements

Approx. Weight	410g
Dimensions/mm 3U Eurocard, as specified in DIN 41494	
Front Panel Width Height Overall Length †	60.9 128.5 189
Power /Current Consumption	
Maximum 5V **Power** 12V	600mA 450mA
Minimum 5V **Power** 12V	0

† Approx. dimensions. Standard 160mm Eurocard.

Voltage Supplies

Logic Supply 5Vdc ±5%.

Relay Supply 12Vdc ±10%

10-780 Modifications

All modules shipped from April 1993 have been fitted with the relay type described in Sec 1.2. This unit is totally RF compatible with units shipped prior to this date which were fitted with a Radiall microwave relay. However please note that the two relay types are not interchangeable, due to minor mechanical differences.

Tesoel
Stockholm — Sweden

TS-Coaxial Switches

Model TS 121
SMA Connector
SPDT-Failsafe



- low current consumption
- low weight
- small

The electromechanical coaxial switch described in this leaflet is used in commercial and defence RF-Systems where low current consumtion, small size, low insertion loss, high reliability are required.

The Coaxial Switch Design Team has more than 20 years experience in developing and manufacturing high quality coaxial switches.

The type of switch described is SPDT, "Single Pole Double Through", failsafe version. It is available with SMA or SMB stainless steel connectors and is provided with a spring operated mechanism. Holding current is required only in one position. The switch circuit is "Break-before-Make". The standard actuator voltage for the switch is 28 Volts with current consumption of typ. 40mA or 12V/75mA. Upon request they can be delivered for other voltages. Customer specified coaxial switches can be made. You are welcome with your specific requirement for your coaxial switches.

Model TS 121 · SPDT · Failsafe · SMA

ELECTRICAL

Frequency Range (GHz)	DC-3	3-12	12-18	18-26.5
VSWR (Max)	1.1	1,35	1.5	1.7
Insertion Loss (Max dB)	0,2	0.3	0.5	0.7
Isolation (Min dB)	80	70	60	50
Average Power W (+20°C)	100	60	30	15

IMPEDANCE: 50 Ohm

RF-CIRCUIT: Break-Before-Make

SWITCH MODE: SPDT failsafe

CONNECTORS: SMA[1]

ACTUATING VOLTAGE: 28 V ± 5 V[1] 12 V ± 2.4 V

ACTUATING CURRENT: 40 mA (−20°C) 75 mA (+20°C)

SWITCHING TIME: 15 ms

1) Available with SMB (TS 123)

MECHANICAL

RF-CONNECTORS: Stainless Steel, Beryllium-Copper

RF-CIRCUIT: Aluminium, nickelplated and goldplated contacts

WEIGHT: 25 Grams

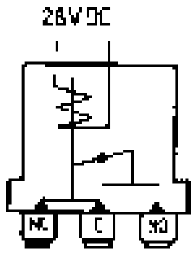
TEMPERATURE: − 40° C to + 95° C

OPERATING LIFE: 1 Million operations

PROTECTON: Splash proof

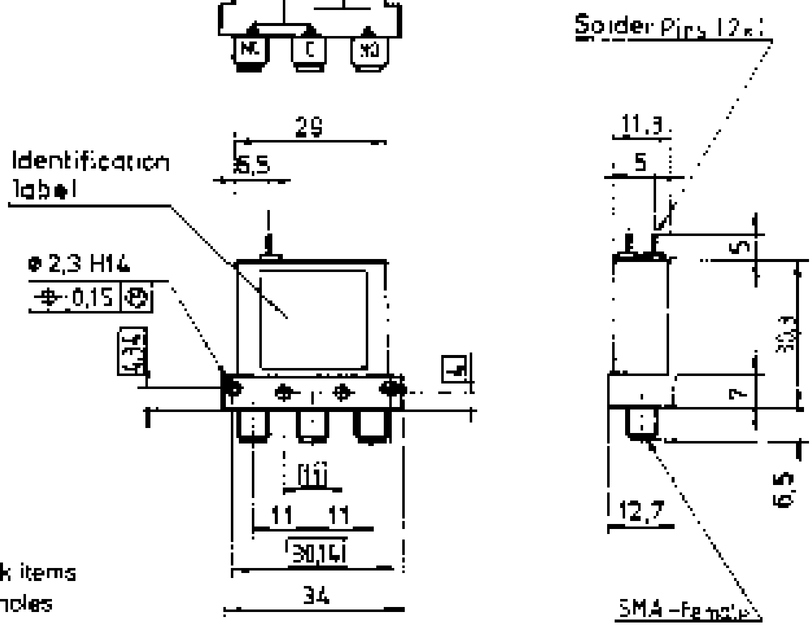
VIBRATION: Sine 1 mm, 5-60 Hz
Sine 10 g, 60-2000 Hz.

TERMINALS: Solder pins



HOW TO ORDER:

TS 121	DC-12	DC-18	DC-26.5
28 V	−01	00	02
12 V	−11	−10	−12



Dimensions in mm for standard stock items
Special versions with two mounting holes are available in high quantities